

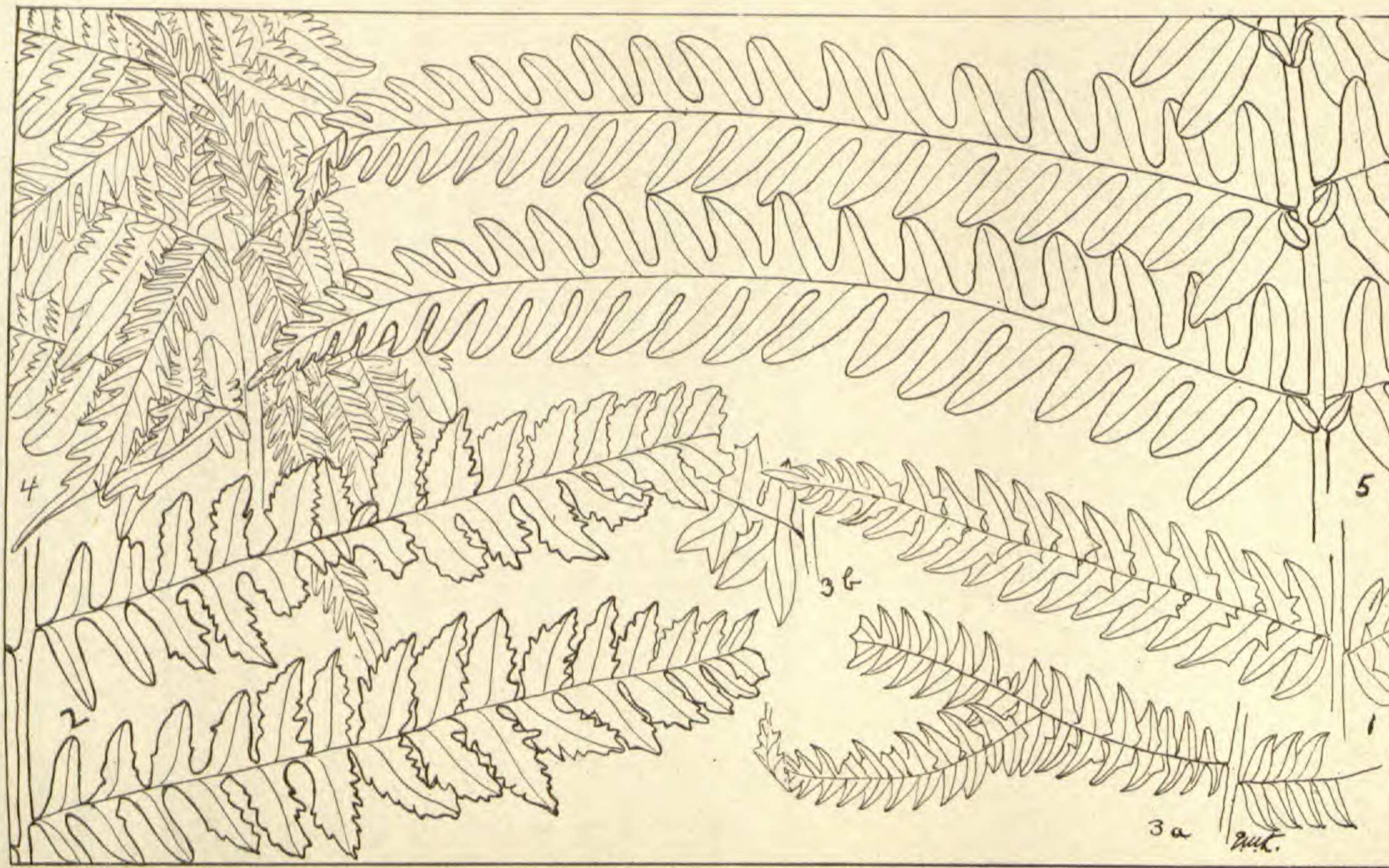
gradually expanding for two-thirds of its length to a width of one inch, the frond being about fifteen inches long; and a short, broad variety, measuring about two inches wide, of almost equal width from tip to base, not over ten inches long. The third of these rarities is a single plant containing seven fronds, none of which measure over one half inch in width, being about nine inches long, and of an equal width up to the sharply tapered and pointed apex; no swelling to the middle of the frond. This is thought to be our rarest form.

OWEN SOUND, ONTARIO

Notes on Cinnamon Ferns

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Up to 1919 I had paid little heed to any ferns except the Maiden-hair and Christmas ferns, and then only for their decorative value. Cinnamon ferns were known to me, but I considered them ugly. In extenuation let me say that the plants were always much broken and discolored by the time I could see them. After seeing a rare fern exhibited with pride by the finder, and learning a little of the joy there might be in finding an unusual form, I began looking for variations from the type in both Interrupted and Cinnamon ferns, mainly, I think, because they were large plants and easily seen. During the next three summers I collected a great many fronds of both species, and regularly burned up the seasons "catch" at the summer's end, as there seemed never to be any of particular interest. In August, 1923, I came upon five Cinnamon ferns whose fronds were strikingly different from any I had seen, the lower inner pinnules being much elongated and incised, and so placed



FORMS OF OSMUNDA CINNAMOMEA

they completely covered the rachis, giving the appearance of a double ruffle down the middle of the frond. Each frond had been somewhat damaged by passing cattle, but still were lovely, and I collected several. Later a friend referred my find to Hopkins' variety *auriculata*. (FERN JOURNAL, July, 1911).

During the season of 1924 I set myself to study Cinnamon ferns in the field, and as a result examined several hundred plants and collected over one hundred fronds, in various localities in Vermont, chiefly within a few miles of Proctor, although I collected more than twenty in the "Perry pasture" in Hartland, and five from my original five plants, which also were in that town, but some distance away. All of the Hartland plants grew in rather wet places, and in my later collecting trips I found the largest and finest plants in wet ground. I have a few beautiful fronds from the dry and rocky top of quite a high hill near Rutland, but they are not half the size of those collected in the swamp at the foot of the hill. With the exception of two, all the fronds collected in 1924 must be referred to *f. incisa* (Huntington) Gilbert, and *f. bipinnatifida* Clute, if one follows Blake's treatment of the species. (Rhodora, Sept., 1923.) Having little technical knowledge of ferns, I feel considerable diffidence in writing about any species and in particular this one, since my observations make me wish Dr. Blake had been a little less rigid in his classification. I found all the fronds that I examined, that must be called *f. incisa*, grouped themselves naturally into four divisions, or phases. 1st. The pinnules were normal except for a few on the pinnae of the middle third of the frond which bore 1-3 lobes, usually not at all prominent, but sometimes rather large and acute. 2nd. The lower inner pinnules would be much elongated and incised, and a few or many other pinnules more or less acutely lobed,

just as depicted in the Hopkins drawing. Occasionally these elongated pinnules would be much longer than indicated in the drawing and more deeply incised, as in my Hartland specimens. 3rd. Nearly *all* pinnules on the upper half or two thirds of the frond—with the exception of the first few nearest the rachis—would be deeply lobed and incised. 4th. The lower inner pinnules of fronds otherwise like No. 3 would be very long and deeply cut. In the 3rd phase I have two distinct forms, both beautiful but very unlike. One, first found in a swampy field in Pittsford, but afterwards collected in several places, is of the dull olive color and thick texture of the type; its pinnae are set close together on the rachis, and the pinnules are almost mathematically, and very acutely, lobed, and usually overlap (fig. 1). In the other found in Brandon and Rutland the color is a rich green, the texture is very *thin*, and the lobes of the pinnules, while acute, are not at all regular in shape and size and for the most part the lobed pinnules are somewhat broader than the others—altogether exceedingly handsome plants (fig. 2). And I may add that these plants had no dead fertile fronds, while the others did. In the 2nd phase—the *auriculata* phase—were some very interesting fronds. One had three forked pinnae and a good many forked pinnules (figs. 3a and 3b). Two from Hartland had no proper apex, but several forked pinnae forming a rosette. One from Lake Dunmore had the inner pinnules of the middle portion of the frond much elongated but without serration, while those on the upper part were much cut. Another from the same locality had many lower pinnules, and usually one or two upper, on *all* pinnae (save the two lowest) on the *right* side of the rachis elongated, while on the *left* side there was but the *one* lower elongated pinnule on a *few* pinnae. Some fronds collected near

Pleiad Lake must be considered as belonging in the 3rd phase, but were quite remarkable in being very *glossy* light green in color, pinnae opposite and wide spreading, a few pinnules lobed, all very acute at tip, and set almost exactly opposite on the mid-vein. The fertile fronds were delicate in structure, pale in color, pinnae wide apart, opposite, and wide spreading—that is, not at all ascending as in the common form. There were many plants.

The ferns that must be referred to *f. bipinnatifida* Clute occurred in several phases also. 1st. I have fronds whose 2–6 lower pinnae bear few to many pinnules somewhat cut. 2nd. Fronds otherwise like No. 1 have elongated, more or less cut inner pinnules on several or many pinnae. 3rd. Pinnae for the lower third or half of the blade will have several or many pinnules very much cut, and sometimes much crowded on the midvein, sometimes more widely spaced than in the common form. 4th. Fronds otherwise like the above have elongated, much cut lower inner pinnules. 5th. Two or several lower pinnules, and one or more upper, will be elongated and incised (Fig. 4). 6th. Several or many or all pinnules on *all* pinnae may be deeply cut, some pinnules being cupped, pinnae and pinnules crowded, and the lower pinnae forked. All of these phases, in both *incisa* and *bipinnatifida*, may be found in both starved and luxuriant plants, in fairly dry or quite wet situations.

One of the two fronds mentioned was a fine example of the variety *frondosa*, taken from an otherwise normal plant. The other came from a noble plant growing in a swampy field. It measured about fifty-two inches high and almost seventeen wide, maintaining that width for nearly the entire length of the blade. Pinnules are much broader than in the common form, and somewhat more widely spaced. The lower inner pinnules of the

middle third of the frond are very slightly longer than the others and have each one lobe next to, and occasionally overlapping, the rachis (Fig. 5). My observations cannot be called extensive, but from what I have seen I am ready to say that Cinnamon fern is to be found in many forms in any locality where the species is at all abundant. It seemed sometimes that no two plants in the same field were anywhere near alike. Again when specimens from stations twenty or more miles apart were compared, they were found to closely resemble each other, even to measurements, and in three cases similar forms had pinnae forked in almost exactly the same way. While resemblance in form was remarked, the great variation in color was also noticed, plants in the same field ranging from pale to rich deep green and dull olive.

PROCTOR, VT.

Recent Fern Literature

Bro. Victorin¹ has excellently supplemented his work on the ferns of Quebec (see this JOURNAL **13**: 118, 1923) with an illustrated pamphlet of 120 pages on the Lycopodiales (that is, the genera *Lycopodium*, *Selaginella*, and *Isoetes*) of that province. As before, his investigations cover a wide field and a great array of facts and opinions, historical, geographical, evolutionary, and otherwise, bearing on the species concerned, is brought together, organized, and set forth in lucid and interesting fashion. In part I, of 83 pages, the groups and species are discussed in detail; the remainder of the work is devoted to a systematic treatment, with keys, descrip-

¹ Victorin, Fr. Marie-. Les Lycopodiniées du Quebec and leurs formes mineures. Cont. Bot. Univ. Montreal, no. 3. 121 pp., 2 pls., 11 figs. Montreal, 1925.